Class I Aquifer Exemption Request
Completeness Check

Project: Alon Bakersfield Property, Inc./Red Ribbon WD-1, WD-2, WD-3, and 7

Date EPA received AE request: 10/9/2015

Date of completeness check: 10/27/2015

Key to tables: Each row in the tables below describes a piece of information that EPA will evaluate to determine whether the aquifer exemption request meets the criteria at 40 CFR 146.4. EPA evaluated the completeness of the information submitted and recorded its findings as follows:

- "Submitted and complete" means that the aquifer exemption request included information on which to evaluate the specific aspect of the criteria (and the relevant information in the request is summarized in the table).
- "Incomplete" means that the applicant submitted some information, but it is incomplete or of insufficient detail to support a determination. EPA requests specific clarification or additional information in these rows of the table.
- "Not provided" means that EPA found nothing in the request that addressed the element.

Tables are provided for each of the potential criteria applicable to Class I aquifer exemptions. However, only **one** of the 40 CFR 146.4(b)(2), 40 CFR 146.4(b)(3), or 40 CFR 146.4(c) criteria must be addressed for a Class I well aquifer exemption, in addition to 40 CFR 146.4(a) for the request to be complete.

General Project and Aquifer Information

General information	Submitted and complete? (If incomplete, describe information needed)
Owner/operator name	**Submitted and complete** Alon Bakersfield Property, Inc.
Well/project name	**Submitted and complete** Alon Rosedale Refinery
API number(s)	**Submitted and complete** Red Ribbon WD-1: API 029-78664 Red Ribbon WD-2: API 030-09732 Red Ribbon WD-3: API 029-88999 Red Ribbon 7: API 029-08304
Well Class (and subtype)	**Incomplete** Wells are described as Class I (UIC permits pending). Is a Class I hazardous or non-hazardous permit application anticipated?
Purpose of Injection	**Submitted and complete** Disposal of oil refinery wastewater

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Where is the proposed aquifer exemption located?	**Submitted and complete** Map of proposed AE boundary included in Appendix G of the application
Township, Section, Range, Quarter	**Submitted and complete** Section 27 & 28, Township 27 South/ Range 29 East MDB&M
Latitude and longitude Information	**Submitted and complete** Red Ribbon WD-1: 35.3786, -119.074005 Red Ribbon WD-2: 35.378262, -119.070817 Red Ribbon WD-3: 35.378493, -119.073935 Red Ribbon 7: 35.376914, -119.070966 (Datum: NAD 83)
County and City	**Submitted and complete** City of Bakersfield, Kern County
Information about distance to nearest Town and/or County	**Submitted and complete** Located within Bakersfield city limits
Name of the aquifer or portion of the aquifer to be exempted	**Incomplete** Please specify what is meant by the "lower Santa Margarita Formation," i.e., what specific portion of the Santa Margarita Formation is to be exempted (please provide upper and lower depths bgs).
Areal extent of the area proposed for exemption	**Submitted and complete** Map of proposed aquifer exemption boundary included in Appendix G of the application
Depth and thickness of the aquifer	**Incomplete** The depth to the formation is approximately 4,350 feet bgs; the injection interval is approximately 5,100 to 5,600 ft bgs. Please confirm the thickness and vertical boundaries of the proposed exempted zone. Also, please confirm that the Santa Margarita is the only formation for which Alon is requesting an exemption *and* that the Etchegoin-Chanac (into which Red Ribbon 7 is completed) has been previously exempted within the project area.
Information on the TDS content of the aquifer, including the TDS at the top and bottom of the exempted zone, and the locations and depths of all fluid samples taken	**Incomplete** TDS ranges from 5,630 to 10,000 mg/L, according to results from fluid sample analyses in Appendix I. Please provide sampling depths or other information to clarify the TDS at the top and bottom of the zone to be exempted.

	Yes	**No**

Water disposal wells into sub-3,000 TDS?		X
Water disposal wells into 3,000-10,000 TDS aquifers?	X	

Regulatory Criteria for Class I Wells:

Information to support a demonstration that the aquifer or portion thereof does not currently serve as a source of drinking water per 40 CFR 146.4(a)

40 CFR 146.4(a) criteria	Submitted and complete? (If incomplete, describe information needed)
How the proposed exempted area was determined *(i.e., does it account for all past and future injection?)*	**Incomplete** Please provide a technical justification of the proposed AE boundary of 1 mile from the boundary of the Alon refinery property, accounting for the injection rate of 5,400 bbl per day and the planned total time frame over which injection operations are planned. Please also describe the method by which this area was delineated.
Lithology	**Incomplete** Described as "sand." Please provide additional detail about the lithology of the aquifer, e.g., results of analyses of the cores collected from the Red Ribbon WD-1, WD-2, and WD-3 wells that are mentioned in Section 6.0.
Permeability and porosity	**Not provided**
Direction of groundwater flow	**Not provided**
Upper and lower confining zone(s) and description of vertical confinement from USDWs	**Incomplete (for lower confining zone)** Section 5.0 states that the upper confining zone "is comprised of approximately 10 to 15 feet of laterally continuous shale that thickens to the north and southeast" with "low permeability, low porosity, and zero oil saturation." Please confirm that the lower confining zone is the Olcese unit of the Fruitvale Formation (this appears to be the case based on the information in Section 5.0). Also, please provide information on how this zone will confine the injected fluids.
Information on drinking water wells that draw from the aquifer proposed for exemption, for	**Submitted and complete** Section 2.3 states that there are no wells that

which the aquifer might be a current source of drinking water	produce water from the proposed exempted aquifer (for potable use or otherwise). Section 4.0 states that the refinery property "is located within the administrative boundary containing water previously defined in April of 1981 as unsuitable for municipal or domestic supply by the State of California, Department of Conservation, Division of Oil and Gas in Application for Primacy in the Regulation of Class II Injection Wells Under Section 1425 of the Safe Drinking Water Act."
Maps of the area, geology, and hydrogeology	**Incomplete** Please provide more detailed information to supplement the general maps of the area in Attachments A–D and G. Some geological data are provided in the Exhibits (structural contour maps of the Santa Margarita and Olcese, isopach map of the Santa Margarita, and cross sections), but additional detail is requested to support EPA's review.
Table of inventoried water wells with owner information, purpose, depth, name of aquifer, well completion, age, and data source (including all wells tapping any aquifer in the area)	**Incomplete** Please provide, for all 14 water wells mentioned in Section 8.1, information about: the owner, purpose, depth, name of aquifer, well completion, age, and data source.
Map showing down-gradient and hydraulically connected water wells (including all wells that draw from the aquifer proposed for exemption or any hydraulically connected aquifers)	**Incomplete** Attachment D shows the locations of the identified water wells. Please provide details on hydraulic gradient/hydrogeology of all wells in the area that are hydraulically connected to the Santa Margarita.
How ground water direction and speed were determined	**Not provided**
SWPAs and designated sole source aquifers	**Not provided**
Size of the area evaluated and rationale for determining the size	**Not provided**
Information on the capture zone of wells in the area	**Not provided**
How the lifetime of the well was determined	**Not provided**

Information to support a demonstration that the aquifer or portion thereof is situated at a depth or location which makes recovery of water for drinking water purposes economically or technologically impractical per 40 CFR 146.4(b)(2)

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Checklist item - 40 CFR 146.4(b)(2)	Submitted and complete? (If incomplete, describe information needed)
Availability of less costly and more readily available alternative supplies	**Incomplete** Section 8.2 states that "The top of the lower Santa Margarita Formation is situated at a depth of approximately 4,500 feet bgs, above which lie shallower, more economically and technologically viable sources of fresh water resources." Please provide additional information to support a justification (i.e., the technologies in place to treat this water to drinking water standards and their costs relative to using the Santa Margarita).
Adequacy of alternatives to meet present and future needs	**Not provided**
Costs for treatment and/or development associated with use of the aquifer	**Submitted and complete** Section 7.0 estimates the cost of producing and treating water from the Santa Margarita.
An economic evaluation that considers: distance to PWS; water sources; availability, quantity and quality of alternative water supply sources; future water supply needs in the area; depth of the aquifer; and water quality	**Incomplete** Section 7.0 considers depth and water quality. Please provide a more detailed economic evaluation that considers all of the following: 1. Distance to public water supplies. 2. Current sources of water supply in the Santa Margarita. 3. Availability, quantity and quality of alternative water supply sources. 4. Analysis of future water supply needs in the area. 5. Depth of the Santa Margarita. 6. Water quality of the Santa Margarita.

Information to support a demonstration that the aquifer or portion thereof is too contaminated per 40 CFR 146.4(b)(3)

Checklist item - 40 CFR 146.4(b)(3)	Submitted and complete? (If incomplete, describe information needed)

Concentration, type, and source of contaminants	**Incomplete** Table 6-1 provides measured concentrations of a set of contaminants and the text notes that "Several contaminants present within the formation fluid exceed the federal MCLs for drinking water." Detail on formation fluids is in Appendix I. Please provide information on the contamination source (e.g., what processes generate the waste that has been previously injected into this formation).
If contamination is a result of a release, whether contamination source has been abated	**Not provided**
Extent of the contaminated area	**Not provided**
Probability that the contaminant plume will pass through the proposed exempted area	**Not provided**
Ability of treatment to remove contaminants from ground water	**Incomplete** Section 7.0 lists the components of an expected treatment process, but also states that "it may be technologically infeasible to treat the water to meet current state or federal drinking water standards." Please elaborate on this statement.
Current and alternative water supplies in the area	**Incomplete** Section 3.0 states, "Potable water in the AOR is provided by municipal water providers, including California Water Service Company and City of Bakersfield." Please provide information on the source of this water and any alternative supplies.
Costs to develop current and future water supplies (e.g., construction, transportation, treatment costs)	**Incomplete** Section 7.0 estimates the cost of producing and treating water from the Santa Margarita. Please provide similar information on other water supplies.
Projections of future use of the aquifer	**Not provided**

Information to support a demonstration that the aquifer or portion thereof has a TDS of more than 3,000 and less than 10,000 mg/l and is not reasonably expected to supply a public water system per 40 CFR 146.4(c)

Checklist item - 40 CFR 146.4(c)	Submitted and complete? (If incomplete, describe information needed)
Basis for determination that the TDS is between	**Submitted and complete**

3,000 and 10,000 mg/l (for example, are current, detailed analysis reports provided, from a lab that is certified in California?)	Section 8.3 states, "water sample analytical data from the wells completed within the Santa Margarita indicate that the total dissolved solids content of the groundwater ranges from 5,630 – 10,000 mg/L." Information on sampling and analytical methods from 2007 (including the laboratory used) is presented in Section 6.1.
Basis for determination that the aquifer is not reasonably expected to supply a PWS	**Not provided** General statements are made about "shallower, more economically and technologically viable sources of fresh water resources." Please provide more specific information to support a determination that the aquifer is not reasonably expected to supply a PWS.
Information about water quality and availability	**Incomplete** Section 6.2 provides information on formation fluid quality. Please provide information about the quantity and availability of water resources.
Potential PWS use of the aquifer, including description of current sources in the area, the adequacy of current sources to supply future needs, population projections, economy, future technology, and other available water supply sources in the area	**Not provided**